Remarks

Claims 1-13 remain pending. Claims 1, 7, and 13 are hereby amended. No new matter is being added.

Claim Rejections--Section 102

Claims 1-13 were rejected under 35 U.S.C. 102 as being anticipated by the Schmidt reference (US 6,195,793). This rejection is respectfully traversed.

Claimed Invention of Inline Specialization

Amended claim 1 recites as follows.

1. A method of compiling a computer program with inline specialization, the method comprising:

given a call-graph, if multiple call-chains in the call-graph have a common call site, inlining the common call site in one or more of the call-chains, **without necessarily inlining the common call site into all of said multiple call-chains having the common call site.**

(Emphasis added.)

As shown above, amended claim 1 recites limitations pertaining to "inline specialization." As recited in amended claim 1, this inline specialization pertains to the capability to inline a common call site "in one or more of the call-chains, without necessarily inlining the common call site into all of said multiple call-chains having the common call site." (Emphasis added.)

As discussed in the specification, "We introduce the concept of inline specialization whereby a call site, that is common to more than one call chain, gets inlined in only some of the call chains. Thus the common call site gets inlined in a specialized manner." (Page 26, lines 3-5.)

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Inline specialization may be understood, for example, using the illustration of FIG. 6 of the present application. For convenience of reference, FIG. 6 is reproduced below.
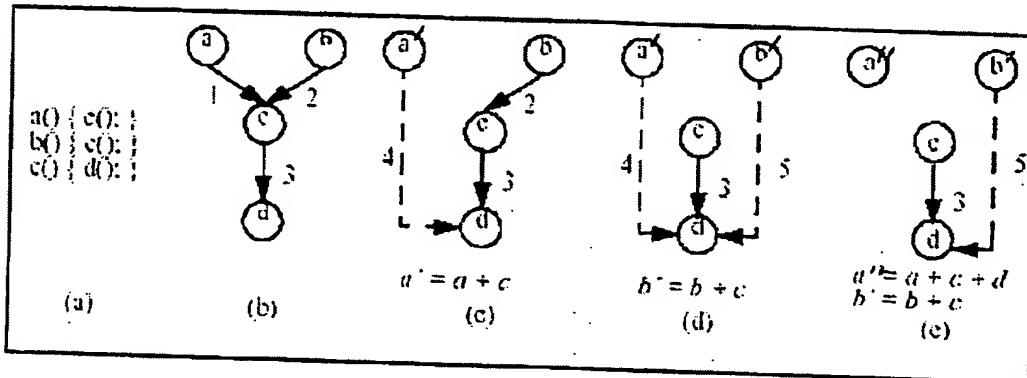

Figure 6

As shown in the call-graph in FIG. 6(b) above, the call site "c" is common to two call-chains (one being a-c-d and the other being b-c-d).

Conventionally, without inline specialization, call site c would be either inlined into both routines a and b by creating modified routines a' and b' as shown in FIG. 6(d), or call site c would not be inlined into either routines a or b.

On the other hand, with inline specialization enabled in accordance with the claimed invention, call site c may be inlined into routine a by creating routine a' without being inlined into routine b. This inline specialization (into routine a, but not into routine b) is shown in FIG. 6(C) above.

Very Different from the Adaptive Inlining of the Schmidt Reference

In contrast to the claimed inline specialization, Schmidt discloses adaptive inlining. Applicants respectfully submit that the adaptive inlining of Schmit is very different from the claimed inline specialization.

The inlining technique of Schmidt deals with the problem of excessive code bloat. As described in Schmidt, "In accordance with features of the preferred

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embodiment, an **adaptive** approach is taken for selecting inline candidates."
(Column 3, lines 40-41.)

Schmidt describes its inlining procedure as follows. "First the best call sites at which to inline are estimated, based upon the execution frequencies of the call sites and the sizes of the called procedures. Then the call graph is processed starting from the leaves and working up. Each time an arc that was selected for inlining is encountered, the original bloat estimate is compared with the current size of the procedure, for example, incorporating sizes of any procedures that were inlined into the procedure. If the called procedure has been bloated beyond an acceptable limitation, it may be rejected for inlining."

More particularly, Schmidt describes the adaptive inlining aspect as follows. "If this were the whole algorithm, it could result in massive underspending of the code bloat budget or the opposite of the problem we are trying to solve. To avoid this, a sorted list of alternative inlining candidates is maintained as the call graph is processed. **Whenever an inline candidate is rejected because of excessive bloat, the best alternative inline candidate is selected and inlined instead, provided that the program size increase entailed will not be much greater than the original code bloat estimated for the rejected procedure.** Using this method, the final code bloat is close to the original code bloat budget with an effective set of procedures selected for inlining."

As seen from the above discussion, the <u>adaptive</u> inlining of Schmidt does <u>not</u> disclose or teach the inline <u>specialization</u> of the claimed invention. Hence, applicants respectfully submit that amended claim 1 is now patentably distinguished over Schmidt.

Claims Depending from Claim 1

Claims 2-6 depend from claim 1. As such, for at least the same reasons as discussed above in relation to claim 1, claims 2-6 are also patentably distinguished over Schmidt.

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Claims 7-14

Amended claim 7 is an apparatus claim which is limited to means for inline specialization, similar to the limitations of claim 1. Hence, applicants respectfully submit that claim 7 is also patentably distinguished over Schmidt for at least the same reasons as discussed above in relation to claim 1.

Claims 8-14 depend from claim 7. As such, for at least the same reasons as discussed above in relation to claim 7, claims 8-14are also patentably distinguished over the cited reference.

Claim 15

Amended claim 15 is a computer program product claim which is limited to a compiler including an inline specialization feature, similar to the limitations of claim 1. Hence, applicants respectfully submit that claim 15 is also patentably distinguished over Schmidt for at least the same reasons as discussed above in relation to claim 1.

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Conclusion

For the above-discussed reasons, applicant respectfully submits that claims 1-15 are now patentably distinguished over the applied art. Favorable action is respectfully requested.
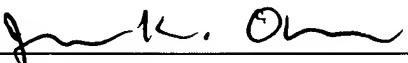
The Examiner is also invited to call the below-referenced attorney to discuss this case.

Respectfully Submitted,

Dhruva Ranjan Chakrabarti, et al.

Dated: *Jan. 19, 2007*
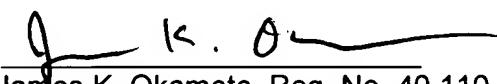
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